use and unit prices estimated from other sources. The level of detail collected in clinical trials varies and determines which resource costing methods can be used. Using hospital inpatient data, this study compares three resource costing methodologies that utilize varying levels of information about hospitalizations. **METHODS:** As part of project TrEAT, an alcohol-related intervention study, hospital primary discharge data were collected for HMO patients. Data from HCUP National Inpatient Sample (NIS) 2000 are used for estimating unit prices. Three resource costing methods are applied: 1) a per day unit price over all hospitalizations; 2) a unit price per day for each DRG; and 3) a unit price per day for each primary ICD-9-CM discharge diagnosis. Inpatient costs are calculated as the product of these unit prices and the observed inpatient days. Inpatient costs for the intervention and control groups are compared. **RESULTS:** For the 1-year period following study enrollment, method 1 yields control and intervention group averages of $485($2736) and $246($1458), respectively. Method 2 produced mean and standard deviations of costs that were approximately twice as large, $956($5695) and $543($3755) for the control and intervention group, respectively. Method 3 produced mean and standard deviations larger than Method 1 but smaller than Method 2: $691($3740) and $445($2982) for the control and intervention group, respectively. Differences between the intervention arms are greater using Method 2, ($412 versus $238 and $245). **CONCLUSIONS:** The level of resource use detail can affect the results of economic evaluation of clinical trials. Costing hospitalizations using DRG level data resulted in larger differences between intervention arms than methods using ICD-9-CM level data or a fixed per diem amount.

PMD19

COMMUNITY OR PATIENT PREFERENCES FOR COST-UTILITY ANALYSES: DOES IT MATTER?

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OBJECTIVE: To determine if it matters whether we use community or patient preferences in cost-utility analysis. **METHODS:** Patients were randomized within 6 weeks of acute myocardial infarction to a 2-month cardiac rehabilitation intervention (n = 99) or to usual care (n = 102). Data were collected at baseline and at 2, 4, 8, and 12 months. Community-based preferences for patients' health states were measured using the Quality of Well-Being (QWB). Patients' preferences for their subjectively-defined health states were measured using the Time Trade-off (TTO) technique. Agreement between QWB and TTO measures was assessed using intra-class correlation coefficient (ICC). Responsiveness of each measure was calculated as the standardized response mean (SRM). Quality-adjusted life years (QALYs) experienced by each patient were estimated separately using both QWB and TTO measurements. Costs, measured from the societal perspective for each individual patient, included those borne by the health-care system and the rehabilitation program and the patients. Incremental cost-utility ratios were estimated using mean costs and QALYs for the study groups. QWB-based and TTO-based cost-utility results were compared. **RESULTS:** Agreement between QWB and TTO scores varies from negligible (ICC = 0.069) at baseline to strong (ICC = 0.607) at 12-month assessment. TTO scores are higher than QWB scores ($p < 0.01$). QWB and TTO scores for both groups of patients improved ($p < 0.05$) between baseline and 12 months. SRMs are 0.64 for QWB and 0.34 for TTO. QALYs gained by rehabilitation are 0.011 using QWB and 0.040 using TTO, at a cost (US $ 2001) of $702 per patient. The cost-utility of rehabilitation is $62,000 per QWB-based QALY gained and $17,500 per TTO-based QALY gained. **CONCLUSIONS:** The QWB and TTO results are different. This may not be generalizable but is cause for concern because it suggests that the cost-effectiveness of an intervention may differ depending upon whether community or patient preferences are used.

PMD20

SYSTEMATIC REVIEW OF ECONOMIC EVALUATION STUDIES OF MEDICAL TECHNOLOGY IN THAILAND

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OBJECTIVES: In Thailand, economic evaluation of medical technology has been increasingly used as a tool to aid decision making particularly since the economic crisis in 1997. Despite the increased number of economic evaluation studies, there has been no study evaluating their quality. The purpose of this study is to systematically identify all economic evaluation studies in Thailand and to assess their quality. **METHODS:** We performed a systematic search for economic evaluation studies through MEDLINE (1966–2002), Thai index Medicus (1918–2002), and Thai Thesis Online (1966–2002). In addition, we electronically searched for "research reports" or "theses" through 8 major university libraries to identify potential studies. Only Thai studies evaluating both cost and outcomes were included. All studies were evaluated using a standardized abstraction form, which was developed based on Drummond's 10-item checklist. **RESULTS:** A total of 6488 studies was identified from the search but only 49 published and 57 unpublished studies met inclusion criteria. After complete assessments of pub-

lished studies, only 25 studies were included. The majority of the studies was cost-effectiveness analysis (68%). The common weaknesses included the use of non-incremental analyses (68%, 17/25), lack of question clearly stated (36%, 9/25), and an absence of perspective explicitly stated (36%, 9/25). Provider perspective was used most frequently (48%, 12/25). Only six studies properly identified, measured, and valued all relevant cost and consequences of the interventions studied. Out of 6 studies which required differential timing adjustment, 83% (5/6) discounted both cost and consequences. Only 8 studies (32%) properly performed sensitivity analyses. Our findings found no study meeting all criteria of Drummond's 10-item checklist. **CONCLUSIONS:** Overall, the quality of economic evaluation studies in Thailand is still poor. This study indicates the urgent needs to improve the standard of economic evaluation studies in Thailand.

PMD21

A RELIABLE AND ROBUST ALGORITHM TO DETERMINE IN-HOSPITAL LENGTH OF STAY AND READMISSIONS USING RAMQ

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OBJECTIVES: The Regie de l'assurance maladie du Quebec (RAMQ), an administrative database containing medical and pharmaceutical services records, is frequently used in epidemiologic and economic studies. In-hospital length of stay (LOS) and readmissions are important components of such studies and can be estimated through a linkage between RAMQ and MED-ECHO (hospital separation records) databases with high reliability. However, this linkage is cumbersome and time-consuming. These parameters can also be estimated directly from RAMQ medical services database. Unfortunately, the data concerning hospitalizations are not specifically contained in RAMQ and must be deduced from in-hospital medical procedures, claimed by the physician. The objective of this study was to develop and to validate an analytical algorithm to estimate LOS and readmissions in a target population using RAMQ claims database. **METHODS:** Using the RAMQ medical services database, we identified 1441 patients aged ≥65 years with hospitalization records, who were treated for chronic obstructive pulmonary disease (COPD) between 1989 and 1996. In-hospital claims were identified using institutional coding. The validation process was then implemented through comparison analyses with a "gold standard", MED-ECHO database, using deterministic linkage method. **RESULTS:** According to the RAMQ, 1233/1441 patients were admitted at least once during the study period. Compared to MED-ECHO, the sensitivity and specificity of the algorithm identifying the first in-hospital stay (1174 cases) were 97% and 75%, respectively, with $\xi = 0.76$. The mean LOS was 12.1 days, with a geometric mean of 6.2 days in RAMQ vs. 13.5 and 6.7 days ($p < 0.001$) in MED-ECHO; the average readmission was 3.7 times vs. 3.8 ($p = 0.36$) for the entire cohort, respectively. **CONCLUSIONS:** The algorithm is able to predict in-hospital LOS and readmissions with slight underestimation. Substantial time and cost savings can be made through estimation of in-hospital stays using RAMQ database. This algorithm is yet to be validated for other medical conditions.

PMD22

AN INVESTIGATION OF PATIENT HETEROGENEITY AND THE POTENTIAL FOR BIAS IN MODELLING STUDIES: AN EXAMPLE USING A MARKOV MODEL OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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OBJECTIVES: Patient characteristics (age, sex, smoking status, baseline FEV-1 percent predicted) can have important consequences for the prognosis of Chronic Obstructive Pulmonary Disease (COPD). A Markov model for COPD was developed that allowed different patient prognoses and consideration was given to how such patient heterogeneity be analysed and presented. **METHODS:** A four state Markov model of COPD progression (mild, moderate, severe COPD and a dead state) was structured using the American Thoracic Society's FEV-1 thresholds for the definition of disease. Time to progression through the states was modeled as a function of age, sex, baseline FEV-1 and smoking status. Frequency of disease exacerbations was modeled as a function of the disease state. Utility values for the health states were taken from the literature and costs were estimated from the literature and expert opinion. Treatment effects were estimated from emerging clinical trial data. Lifetime cost and QALY outcomes were predicted from the model for 2068 subjects for whom information on prognostic factors was available. **RESULTS:** Evaluating the model at the mean of the prognostic factors for the population of interest gave costs of $41,000 and $66,000 for the control and treatment groups. The corresponding QALY estimates were 2.6 and 3.5 leading to an estimated ICER of $27,000 per QALY gained. However, averaging across the 2068 individual estimates yielded $43,000 and $72,000 for costs and 3.7 and 4.6 for QALYs in the control and treatment groups respectively, generating an ICER estimate of $32,000 per QALY. **CONCLUSIONS:** These results clearly demonstrate how, in the presence of heterogeneity, evaluating models at the average values of important prognostic factors can lead to serious bias compared to averaging over individual-based predictions. This bias is due to the non-linearities inherent in most Markov models and is exacerbated once uncertainty in parameter estimation is included in a fully probabilistic framework.